TITLE OF THE INVENTION

MODULAR RACK-MOUNTING SYSTEM

BACKGROUND OF THE INVENTION

The present invention relates to rack-mounting systems, and more particularly to a modular rack-mounting system that is flexible for mounting instruments having different environmental requirements.

In many instrumentation environments a plurality of instruments are mounted in large racks. In order to mount the instruments in the rack, standard sizes have been implemented regarding width and height for each rack unit. As a result the instruments are sized to fit either into a full rack mount or into a half rack mount. In the case of half rack mounts, a full rack mount is generally provided with sleeves that separate the full rack mount into half rack mounts. A typical half rack-mounting system is shown in Fig. 1 where a current fixed rack-mounting system is shown having a pair of half rack sleeves welded together with a pair of bands welded around the front and back edges to provide structural stability. The sleeves have ventilation holes in them in a particular configuration to allow cooling air to circulate around the instrument according to the instrument's requirements when mounted in the rack. As long as all instruments have the same requirements for air circulation, for example, this fixed rack-mounting system is adequate. But as new instruments are developed, different air circulation requirements arise requiring different sleeve configurations.

To provide for all the different sleeve ventilation configurations to enable a user to mount instruments on the rack in any desired configuration requires an

innumerable number of different rack-mounting systems.

Therefore what is desired is a flexible modular rack-mounting system that allows for the exchange of different sleeve configurations while maintaining a single rack-mounting system.

BRIEF SUMMARY OF THE INVENTION

Accordingly the present invention provides a flexible modular rack-mounting system that has a rigid rack frame having a top, bottom and two sides defining a central compartment, a central rib attached between the top and bottom of the frame to divide the central compartment into two compartments, and a sleeve that slides into either compartment defined by the rack frame and central rib. A hole is provided at a point along each side of the sleeve such that, when the sleeve is slid into the rack frame, a button mounted on a flat spring attached to the frame sides and/or the central rib engages the hole to hold the sleeve securely in place. To remove or replace the sleeve, the button is depressed from the interior of the sleeve and the sleeve is slid out.

The objects, advantages and other novel features of the present invention are apparent from the following detailed description when read in conjunction with the appended claims and attached drawing.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

Fig. 1 is a perspective view of a prior art rack-mounting system.

Fig. 2 is an exploded perspective view of a modular rack-mounting system according to the current invention.

Fig. 3 is an exploded perspective view of a first embodiment of a snap and latch system for the modular rack-mounting system according to the present invention.

Fig. 4 is a side plan view of a central rib for the modular rack-mounting system according to the present invention.

Fig. 5 is a perspective view of the central rib of Fig. 4 with the snap and latch system of Fig. 3 mounted thereon according to the present invention.

Fig. 6 is an exploded perspective view of a second embodiment of a snap and latch system for the modular rack-mounting system according to the present invention.

Fig. 7 is a side plan view of a frame portion of a modular rack-mounting system according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to Fig. 2 a modular rack-mounting system **10** is shown having a frame **12** and a pair of interchangeable sleeves **14, 16**. The frame **12** has a left and a right portion **18, 20** and a central rib **22**, dividing the interior of the frame into two compartments. The left and right portions **18, 20** may have interlocking fingers **24** that are press fitted together and then optionally spot welded to assure rigidity of the frame **12** and provide a smooth surface. The central rib **22** is affixed to the left and right portions **18, 20** by any suitable means, such as rivets, screws, spot welding or the like. Each sleeve **14, 16** has a hole **26** in each side. The holes **26** engage snap and latch systems **28**

attached to the sides of the left and right portions **18, 20** and both sides of the central rib **22**. To secure the sleeves **14, 16** in the frame **12**, the sleeves are slid into the respective compartments in the frame **12** formed by the sides of the frame and the central rib **22** until the holes **26** engage the snap and latch systems **28**. To remove and exchange sleeves **14, 16**, a button **30** that is part of the snap and latch system **28** and extends into the holes **26** is depressed from the interior of the sleeves to release them and allow them to be slid out of the frame **12**. In this manner any sleeve configuration may be placed in either half rack compartment formed by the frame **12** and central rib **22** in order to accommodate the environmental requirements of different instruments.

The sleeves **14, 16** may be formed from sheet metal material that is punched and folded appropriately. The joint **27** where the folded ends meet to complete the sleeve **14, 16** may be overlapped and welded as shown in Fig. 2, or may have interlocking "fingers" that are press fitted together and optionally spot welded as described above with respect to the frame **12**.

As shown in Fig. 3 a first snap and latch system **28A** that is mounted on the central rib **22** has a support plate **32** having a mounting section **34** and an offset section **36** with a central hole **38**. A spring plate **40** has a support end **42** and a spring end **44**. Mounted on the spring end **44** is the button **30** using any suitable means **46**, such as screws, rivets or the like. The button **30** is mounted so that when the spring plate **40** is mounted between central rib **22** and the support plate **32** it protrudes through the central hole **38** of the offset section **36**. The button **30** has a small radius around the periphery of the protruding head,

and the sleeves **14, 16** also have a slight radius along their edges. Referring further to Fig. 4 the central rib **22** has a pair of mounting locations **41, 43** on either side of a through hole **45**. When mounted in opposing manner on opposite sides of the central rib **22**, as shown in Fig. 5, the spring ends **44** of the spring plates **40** are located so that, when the button **30** is depressed, the spring end may deform into the through hole **45** to allow the button to clear the hole **26** in the sleeve **14, 16**.

A simpler snap and latch system **28B** may be mounted on the frame **12** itself, as shown in Fig. 6. A spring steel ribbon **48** has the button **30** mounted on it by suitable means **50**. The side of each frame portion **18, 20**, as shown in Fig. 7, has a pair of opposing flanges **52, 54** on the exterior flanking a hole **56**. The spring steel ribbon **48** is secured between the flanges **52, 54** on the exterior of the frame portion **18, 20** so that the button **30** extends through the hole **56**.

Although what is described above is a half-rack mounting system, where the frame **12** and central rib **22** form two compartments, the central rib may be removed to form a single compartment for a full-rack mounting system. For the full-rack mounting system the sleeves **14, 16** are sized accordingly, and only the simpler snap and latch system **28B** of Fig. 6 mounted on the frame **12** is used to secure the sleeves in the frame.

Thus the present invention provides a modular rack-mounting system that is flexible enough to accommodate different sleeves according to environmental requirements of instruments to be mounted therein, the system having a rigid frame with a central rib and snap and latch systems mounted on the rib and

frame so that the sleeves are retained in the frame when inserted into the frame, yet are releasable so they may be exchanged according to instrument requirements.